

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:  
a semiconductor chip;  
a stud bump provided on an electrode of said semiconductor chip; and
- 5 an adhesive layer provided on a surface of said semiconductor chip on which said electrode is formed, wherein said stud bump projects from a surface of said adhesive layer.
2. The semiconductor device according to claim 1, further comprising an interposer bonded through thermocompression bonding.
3. A semiconductor device comprising:  
a semiconductor chip;  
a protection resin layer provided on a surface of said semiconductor chip on which an electrode is formed;
- 5 a bump provided on said electrode of said semiconductor chip and exposed at a surface of said protection resin layer; and
- 10 an interposer adhered to said surface of said protection resin layer through a cured flux and electrically connected to said bump.
4. The semiconductor device according to claim 2,

wherein said interposer is provided with a device hole.

5. A semiconductor device comprising:

a semiconductor chip;

an adhesive layer provided on a surface of said semiconductor chip on which an electrode is formed;

5 a bump provided on said electrode of said semiconductor chip and exposed at a surface of said adhesive layer;

a wiring pattern adhered to said surface of said adhesive layer and partially bonded to said bump; and

10 an insulating and covering layer for insulating and covering said wiring pattern and selectively opening to form an external connecting portion.

6. A semiconductor device comprising:

a semiconductor chip;

a protection resin layer provided on a surface of said semiconductor chip on which an electrode is formed;

5 a bump provided on said electrode of said semiconductor chip and exposed at a surface of said protection resin layer;

a wiring pattern adhered to said surface of said protection resin layer through a cured flux and partially

10 bonded to said bump; and

an insulating and covering layer for insulating and

covering said wiring pattern and selectively opening to form an external connecting portion.

7. A semiconductor apparatus comprising:

two or more semiconductor devices, each of said devices including a semiconductor chip, an adhesive layer provided on a surface of said semiconductor chip on which  
5 an electrode is formed, and a bump provided on said electrode of said semiconductor chip and exposed at a surface of said adhesive layer,

wherein part of a surface of one of said semiconductor devices on which said adhesive layer is  
10 provided is adhered to part or all of a surface of another one of said semiconductor devices on which said adhesive layer is provided and they are electrically connected to each other with said bumps at the adhesion surface.

8. A semiconductor apparatus comprising:

two or more stacked semiconductor devices, each of said devices including a semiconductor chip having electrodes formed on the front and back, an adhesive  
5 layer provided on the front or back of said semiconductor chip, and a bump provided on said electrode of said semiconductor chip and exposed at a surface of said adhesive layer,

10 wherein one of said semiconductor devices is adhered  
to one of said semiconductor devices below through said  
adhesive layer and the electrodes thereof are connected  
to each other through said bump.

9. The semiconductor device according to claim 1,  
wherein said adhesive layer is a thermoplastic resin with  
adhesion.

10. A method of manufacturing a semiconductor  
device, comprising the steps of:

forming a predetermined number of semiconductor  
chips on a semiconductor wafer and providing a bump on an  
5 electrode of each of said semiconductor chips;

forming an adhesive layer on a surface on which said  
bump is provided;

etching an entire surface of said adhesive layer  
until said bump projects; and

10 cutting said semiconductor wafer for division into  
each of said semiconductor chips.

11. A method of manufacturing a semiconductor  
device, comprising the steps of:

forming a predetermined number of semiconductor  
chips on a semiconductor wafer and providing a bump on an  
5 electrode of each of said semiconductor chips;

forming an adhesive layer on a surface on which said bump is provided;

etching an entire surface of said adhesive layer until said bump projects;

10 cutting said semiconductor wafer for division into each of said semiconductor chips; and

mounting one, or two or more of said semiconductor chips on a single wiring substrate, and performing heating and pressing for adhesion to said wiring

15 substrate with said adhesive layer and electrical connection to wiring on said wiring substrate with said bump.

12. A method of manufacturing a semiconductor device, comprising the steps of:

forming a predetermined number of semiconductor chips on a semiconductor wafer and providing a bump on an electrode of each of said semiconductor chips;

5 forming a protection resin layer on a surface on which said bump is provided;

etching an entire surface of said protection resin layer until said bump projects;

10 cutting said semiconductor wafer for division into each of said semiconductor chips;

for one, or two or more of said semiconductor chips, applying a thermosetting flux to said bump and said



forming an adhesive layer on a surface on which said bump is provided;

etching an entire surface of said adhesive layer until said bump projects;

10 aligning said semiconductor wafer with a wiring substrate through said adhesive layer, and performing heating and pressing for adhesion to said wiring substrate with said adhesive layer and electrical connection to wiring on said wiring substrate with said

15 bump;

cutting said semiconductor chip along its perimeter for division into each of said semiconductor chips.

15. A method of manufacturing a semiconductor device, comprising the steps of:

forming a predetermined number of semiconductor chips on a semiconductor wafer and providing a bump on an  
5 electrode of each of said semiconductor chips;

forming a protection resin layer on a surface on which said bump is provided;

etching an entire surface of said protection resin layer until said bump projects;

10 applying a thermosetting flux to said bump and said protection resin layer or to a wiring substrate corresponding thereto;

disposing said bump on wiring of said wiring

substrate;

- 15 performing heating to solder said bump to said wiring and cure said thermosetting flux; and  
cutting said semiconductor chip along its perimeter for division into each of said semiconductor chips.

16. A method of manufacturing a semiconductor device, comprising the steps of:

- providing a bump on an electrode of a semiconductor chip;  
5 forming an adhesive layer on a surface on which said bump is provided;  
etching an entire surface of said adhesive layer until said bump projects;  
bonding said semiconductor chip to a metal foil  
10 through said adhesive layer; and  
forming said metal foil into a wiring pattern.

17. A method of manufacturing a semiconductor device, comprising the steps of:

- providing a bump on an electrode of a semiconductor chip;  
5 forming an adhesive layer on a surface on which said bump is provided;  
etching an entire surface of said adhesive layer until said bump projects;



aligning said semiconductor chip with a metal foil  
10 through said adhesive layer, and performing heating and  
pressing for adhesion to said metal foil with said  
adhesive layer and electrical connection to said metal  
foil with said bump; and

forming said metal foil into a wiring pattern.

18. A method of manufacturing a semiconductor  
device, comprising the steps of:

providing a bump on an electrode of a semiconductor  
chip;

5 forming a protection resin layer on a surface on  
which said bump is provided;

etching an entire surface of said protection resin  
layer until said bump projects;

aligning said semiconductor chip with a metal foil  
10 through said protection resin layer;

performing heating to solder said bump to said metal  
foil and cure a thermosetting flux; and

forming said metal foil into a wiring pattern.

19. A method of manufacturing a semiconductor  
device, comprising the steps of:

forming a predetermined number of semiconductor  
chips on a semiconductor wafer and providing a bump on an  
5 electrode of each of said semiconductor chips;

forming an adhesive layer on a surface on which said bump is provided;

etching an entire surface of said adhesive layer until said bump projects; and

10 boning said semiconductor wafer to a metal foil through said adhesive layer; and

forming said metal foil into a wiring pattern; and

then, cutting said semiconductor chip along its perimeter for division into each of said semiconductor

15 chips.

20. A method of manufacturing a semiconductor device, comprising the steps of:

forming a predetermined number of semiconductor chips on a semiconductor wafer and providing a bump on an  
5 electrode of each of said semiconductor chips;

forming an adhesive layer on a surface on which said bump is provided;

etching an entire surface of said adhesive layer until said bump projects;

10 aligning said semiconductor wafer with a metal foil through said adhesive layer, and performing heating and pressing for adhesion to said metal foil with said adhesive layer and electrical connection to said metal foil with said bump;

15 forming said metal foil into a wiring pattern; and

then, cutting said semiconductor chip along its perimeter for division into each of said semiconductor chips.

21. A method of manufacturing a semiconductor device, comprising the steps of:

forming a predetermined number of semiconductor chips on a semiconductor wafer and providing a bump on an  
5 electrode of each of said semiconductor chips;

forming a protection resin layer on a surface on which said bump is provided;

etching an entire surface of said protection resin layer until said bump projects;

10 aligning said semiconductor wafer with a metal foil through said protection resin layer;

performing heating to solder said bump to said metal foil and cure a thermosetting flux;

forming said metal foil into a wiring pattern; and

15 then, cutting said semiconductor chip along its perimeter for division into each of said semiconductor chips.

22. The method of manufacturing a semiconductor device according to claim 16, further comprising the step of, after said metal foil is formed into a wiring pattern, selectively forming an insulating and covering

5 layer on said wiring pattern.

23. The method of manufacturing a semiconductor device according to claim 22, further comprising the steps of, after said insulating and covering layer is selectively formed on said wiring pattern, providing a  
5 solder ball on a land portion of said wiring pattern exposed through an opening of said insulating and covering layer.

24. The method of manufacturing a semiconductor device according to claim 10, wherein said adhesive layer is a thermoplastic resin with adhesion.

25. A semiconductor device comprising:  
a semiconductor chip;  
an adhesive layer provided on a surface of said semiconductor chip on which an electrode is formed;  
5 a bump provided on said electrode of said semiconductor chip and exposed at a surface of said adhesive layer;  
a tape substrate; and  
an interposer,  
10 wherein said semiconductor chip is adhered to the front of said tape substrate with said adhesive layer, said semiconductor chip is electrically connected to said

